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REVIEW OF "THE ATOMIC NUCLEUS"

D. Ivanenko

M. I. Korsunskiy's book, The Atomic Nucleus ("Gostekhizdat," 308 pp), is a popular presentation of nuclear physics aimed at a wide circle of readers, from upper-class students to natural science students and technicians. The author is a specialist who has conducted research on energy losses of high-energy electrons. In addition to basic information on radioactivity (Chapter I), atomic models (Chapter II), fundamental properties of nuclei (Chapters III and X), more important nuclear transformations (Chapter IV), fission (Chapter XI), and artificial radioactivity (Chapter VII), the book also includes more complex problems relating to isomerism (discovered by Kurchatov and Mysovskiy) (Chapter VII), the circumstances in the discovery of mesons (Chapter VIII), proof of the neutron-proton model of the nucleus (Chapter X), and secondary neutrons in fission (Chapter XI). An entire chapter (Chapter IX) is devoted to the problem of beta-decay and the neutrino. A paragraph is given to the discussion of radioactive indicators (Chapter VII).

Recent research is also included, e. g., the discovery of heavy mesons (varitrons) with a mass spectrum exceeding the "standard" mass (200 electron masses), and the discovery of transformations between different types of mesons. Accelerators of the synchrotron and phasotron type, suggested by Soviet physicist V. I. Veksler, are described briefly. Although it is difficult to keep up with the pace of contemporary nuclear physics, the reviewer feels that a book of this type should also discuss, for example, recent experiments leading to the discovery of fission of nonradioactive nuclei platinum, thallium, tantalum, and others) under bombardment by alpha-particles, deuterons, and protons accelerated to energies of 200 - 400 Mev, and could even include information on the discovery of the non-kinematic magnetic moment of an electron which supplements the Bohr magneton

$$\mu_{el} = \mu_0 \left(1 + \frac{a}{2\pi}\right) i \; \mu_0 = \frac{eh}{4\pi mc} \; i \; a = \frac{2\pi e^2}{hc} \approx \frac{1}{137}.$$

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Korsunskiy's book emphasizes the role of Soviet science in the development of nuclear physics; it touches upon the works of the Alikhanov brothers, Mysovskiy, Kurchatov, Veksler, Lukirskiy, Flyorov and Petrzhak, Frenkel', Skobel'tsyn, Zhdanov, and a number of other Soviet physicists. However, the reviewer states that there should be more references to the work of other Soviet physicists, in particular, Ya. P. Terletskiy's work on betatron-type accelerators, work on the "luminescent electron," the well-known works of Khlopin on nuclear fission, etc.

The brevity of the betatron discussion and of the description of the powerful method of radioactive indicators is criticized. The discussion of nuclear forces also is somewhat abridged. The absence of material on studies of cosmic rays with the aid of instruments carried by rockets to high altitudes (about 150 kilometers) is a very serious omission. The altitude of 40 kilometers, referred to in Figure 14, belongs to the past.

One should commend the author's highly developed treatment of the problem of beta-decay and his criticism of Bohr's hypothesis concerning the violation of the law of conservation of energy in this process.

The publication of this book does not eliminate the need for books on the same subject for all classes of readers. In particular, there is as yet no complete university course in nuclear physics, complete nuclear physics tables have not been compiled, and almost no literature is available on the history of radioactivity and nuclear physics.

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